

# Pipe Invest

User manual: Version 1.0.0



## LOGSTOR Pipe Invest

Pipe Invest is an asset management tool that will assist you in determining when and where to update your District Heating (DH) network. We have illustrated the good DH pipes with green, the yellow ones might be candidates for renovation, and the red ones are even more ready to be changed.

The main challenge is that no one really knows the value of the DH pipes in the ground nor the quality, so maintenance and renovation is often based on excel sheets and gut feeling.

At the utility, the CEO and the planning department have a shared interest when it comes to renovation, where and when to start. There is also a shared interest between the CEO and the Board of Directors when it comes to the financials, budgets, and forecasts.

Pipe Invest offers an interface where it is very simple to see the current value of the existing network in the ground, but also what investments or projects needed in future to ensure the quality level of the installation.

This is how Pipe Invest works:

## Dataset

You will need to supply a dataset representing your DH network. Upload the dataset for your network here:

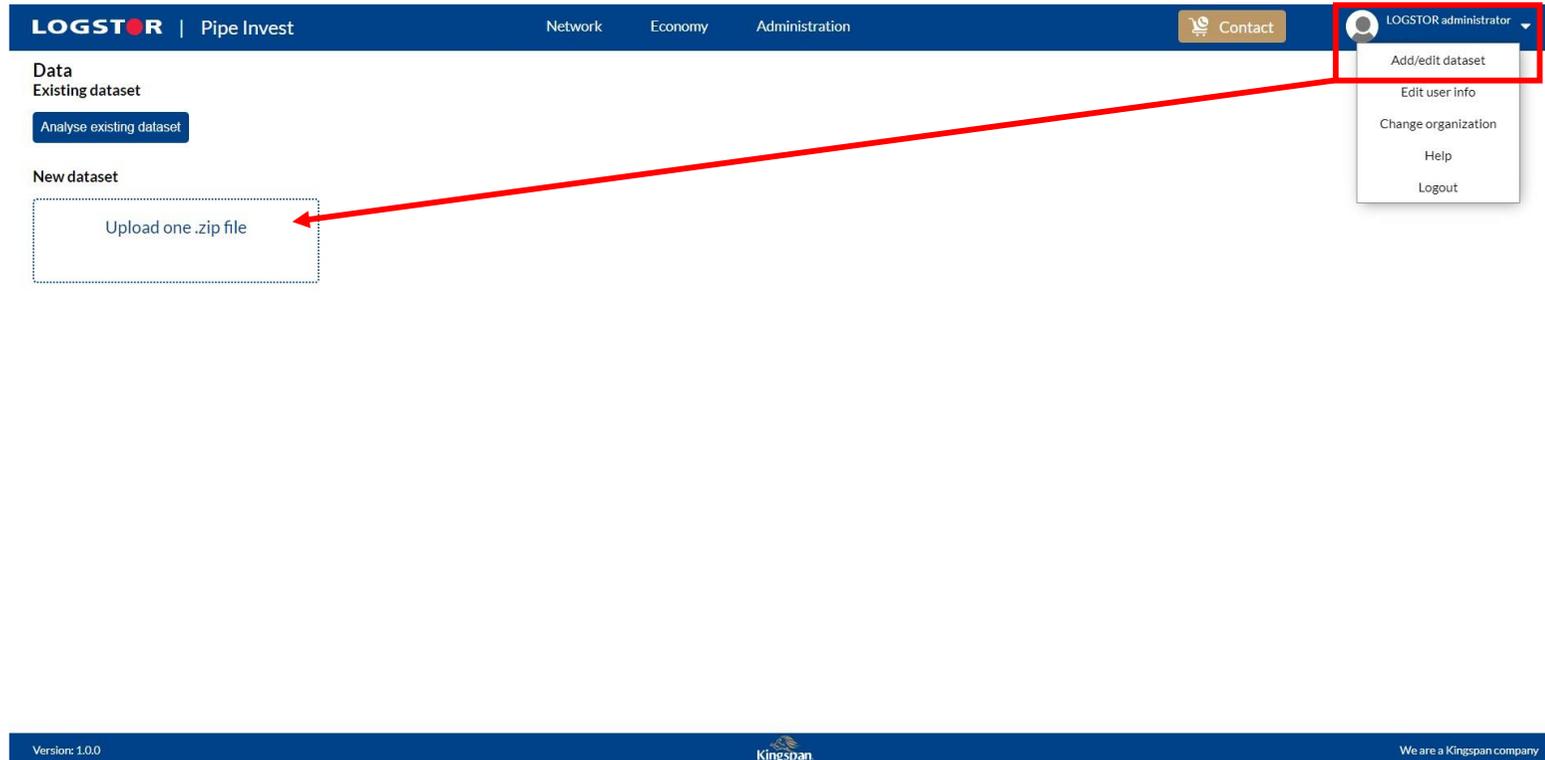


Figure 1: Upload the dataset to get started.

You can also see the separate guide “Import manual” for a more detailed introduction, which can be found in the “Help”-tab in the menu dropdown.

## Administration

In the "Administration"-tab you can manage the users in your legal entity. You can either create new users or update user information and access by clicking individual users.

The screenshot displays the LOGSTOR administration interface. The top navigation bar includes 'LOGSTOR | Pipe Invest', 'Network', 'Economy', and 'Administration'. A 'Contact' button and a user profile for 'LOGSTOR administrator' are also visible. The 'Users' section is highlighted with a red box, and a red arrow points from the 'Create new user' button to the 'CREATE USER' modal form on the right.

The 'CREATE USER' modal form contains the following fields:

- Username\***: Text input field containing 'Test'.
- Name\***: Text input field containing 'Test'.
- Email\***: Text input field containing 'test@kingspan.com'.
- Password\***: Text input field containing 'test'.
- User Group\***: Dropdown menu with 'User' selected.
- Organizations\***: Dropdown menu with 'Test2' selected.
- Active**: Checkmark input field, which is checked.

At the bottom of the modal, there are 'Save' and 'Cancel' buttons.

Figure 2: Administration of users.

## Network tab

Once the dataset for your network is correctly uploaded you will see the network reflected as a “Renovation Index” on the map. The colours used will indicate the condition of your network as calculated by the Pipe Invest calculation matrix that consists of a number of different parameters, all influencing the ROI.

You will also see the pipe data that sums up the total values of the dataset/network in terms of value, length and an estimated replacement cost. If you work with a selection of the total network, this will be reflected here and only represent the selected area.

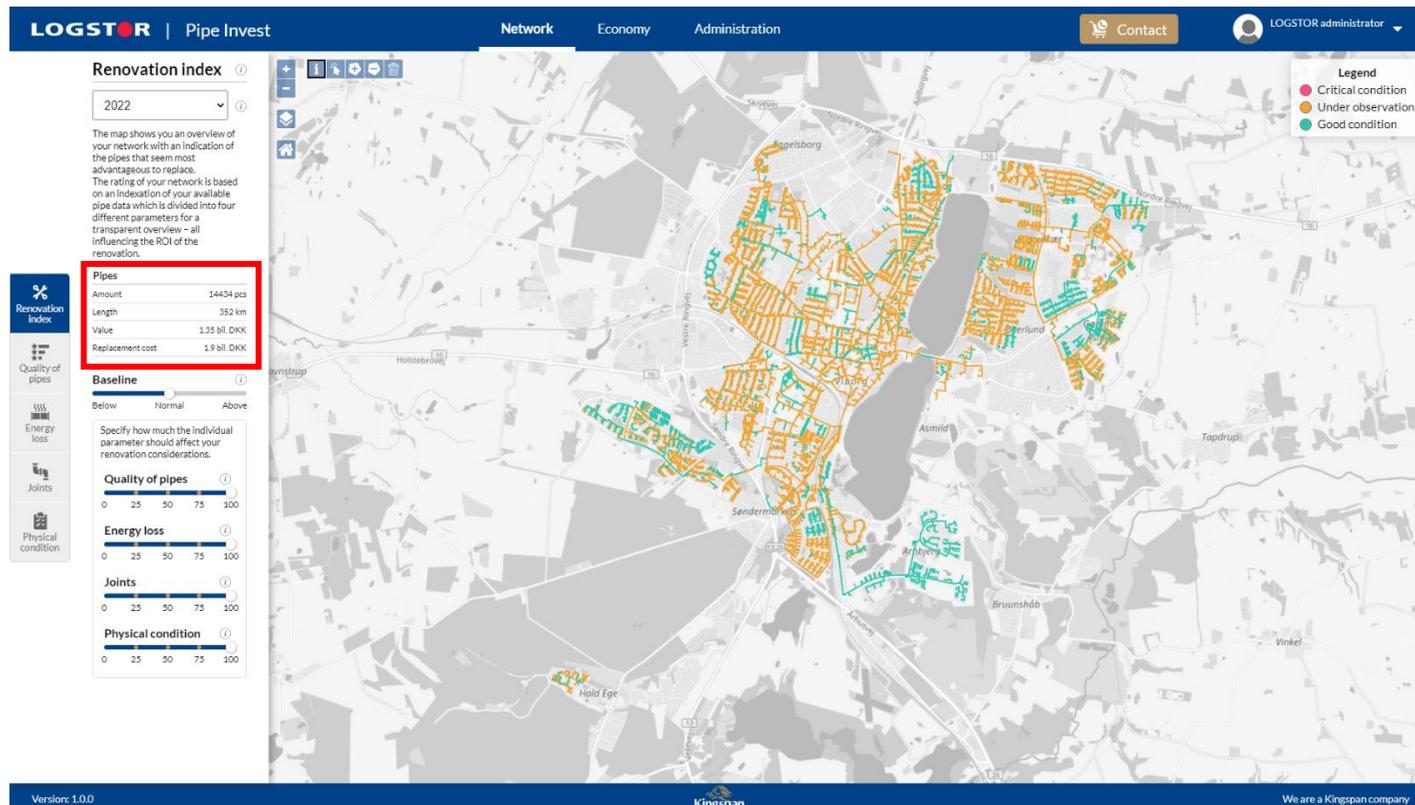


Figure 3: Network tab. The colors will indicate the condition of your network.

## Renovation Index dropdown

In the dropdown menu under the “Renovation Index” you can project your financial overview by selecting a specific year. When you select a year the platform will show you the quality of your pipes if you do not invest in the intervening period.

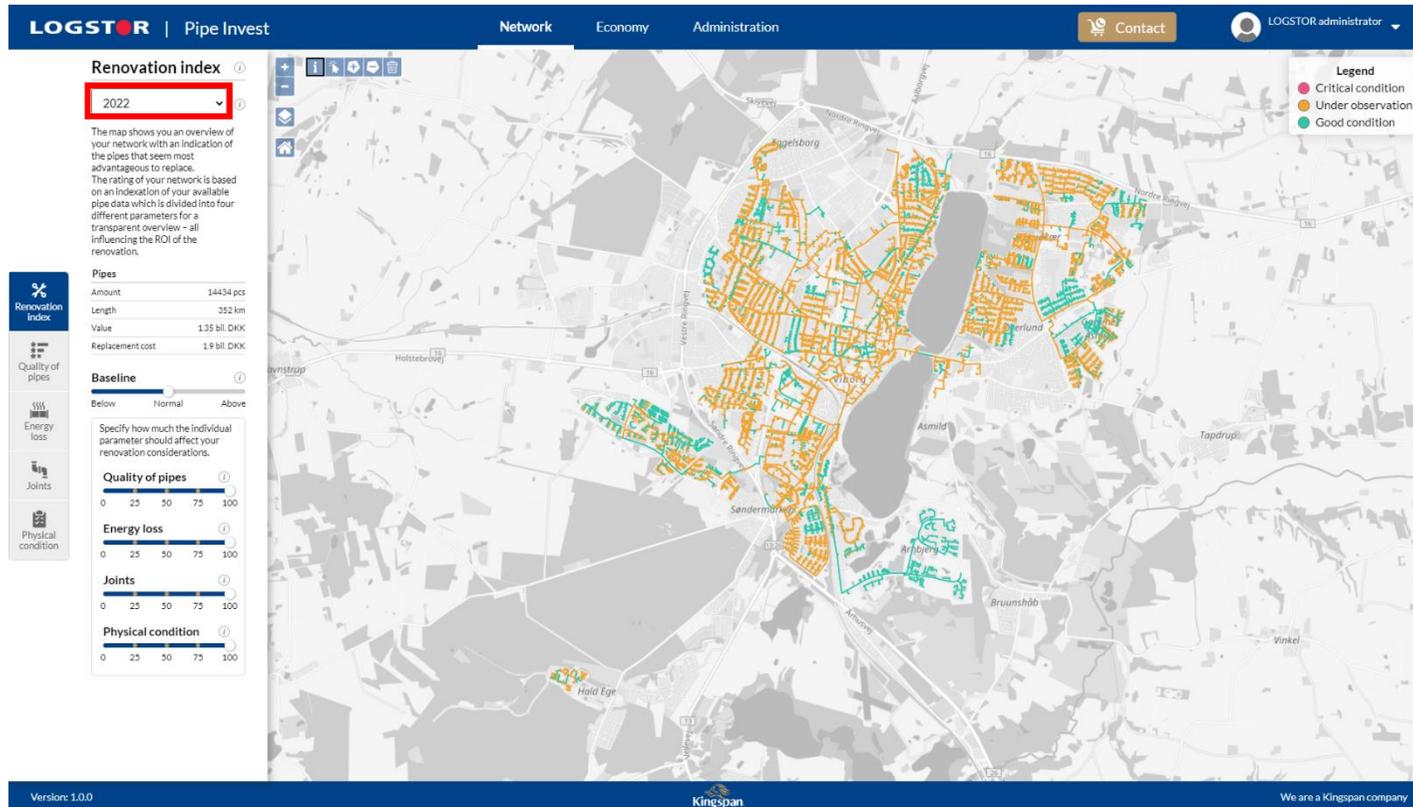


Figure 4: Dropdown menu under Renovation Index.

## Subsections

The “Network”-tab has four subsections – all contributing to the total “Renovation Index”. When you go into the subsections you have an option to evaluate the factors contributing to each subsections weight in the total “Renovation Index”.

## Quality of pipes

In this subsection the assessment of the network is based on the influence of “Quality of pipes” alone. It is based on the type of system and construction date. Now it is time for you to evaluate; do you agree with the condition of the network when looking at the “Quality of pipes” only (refer to the colour legend)? Does it look like you expect or does it look too good or bad to be true? The main goal is to outline how important the subsection is in providing a genuine outline of the DH network.

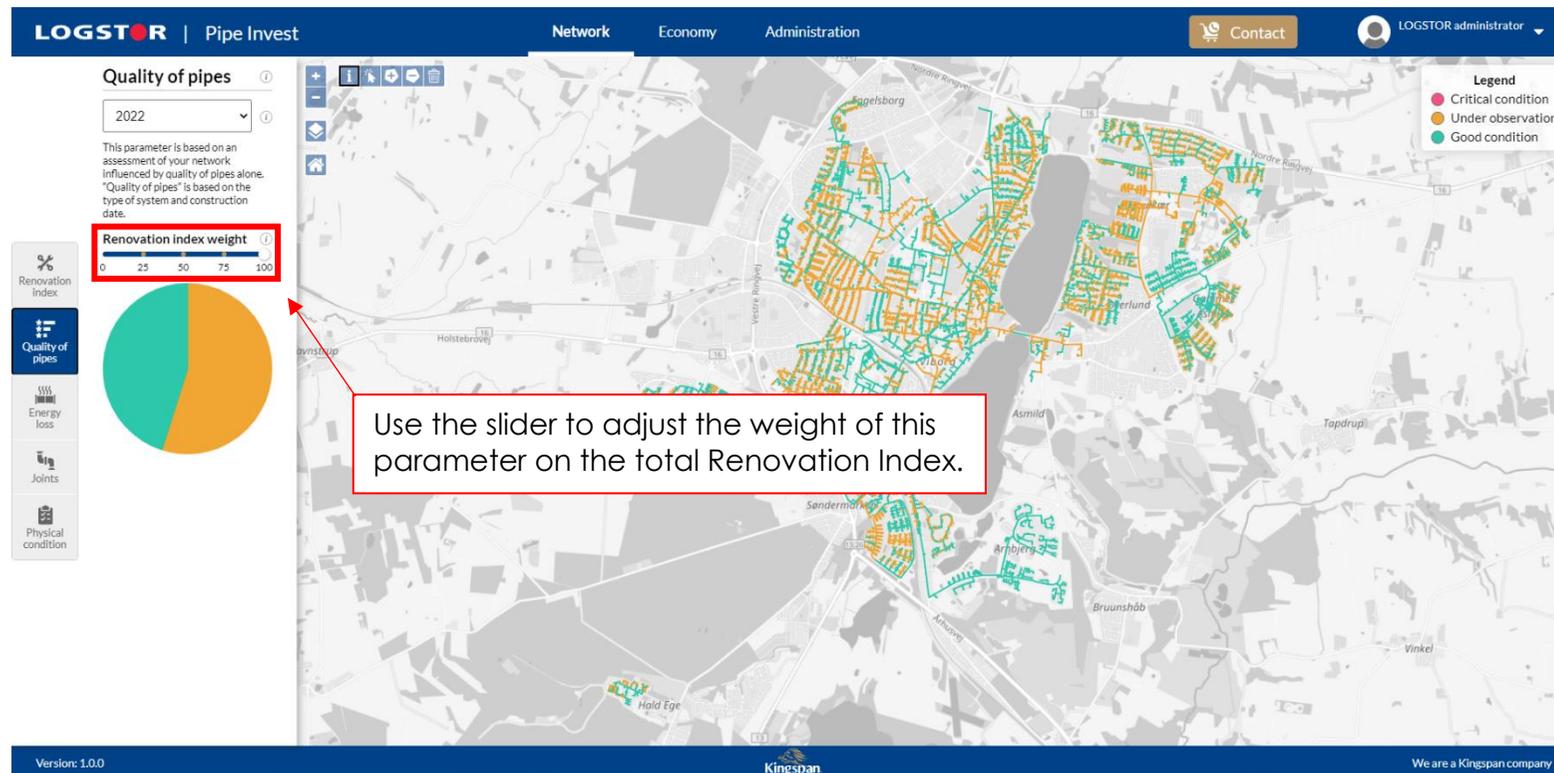


Figure 5: Subsection Quality of Pipes. Evaluation and adjustment of weight in the Renovation Index.

The same applies to the other subsections; so the following is just a quick presentation of the contributing factors for each subsection.

## Energy loss

Here, the assessment of the network is based on the influence of "Energy loss" alone. This is based on the type of system, construction date, and type of isolation.

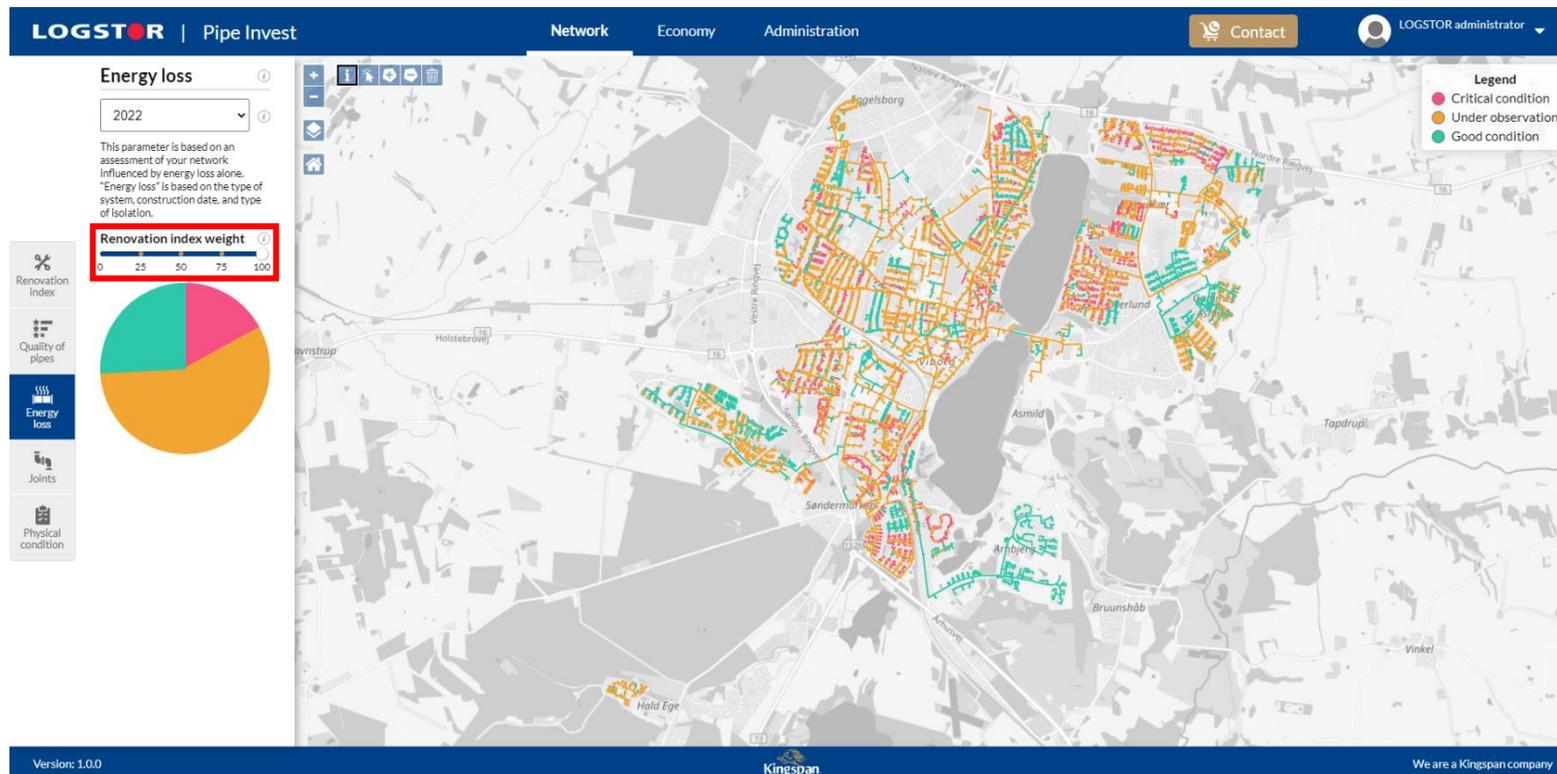


Figure 6: Subsection Energy Loss. Evaluation and adjustment of weight in the Renovation Index.

## Joints

In this subsection, the assessment of the network based on the influence of "Joints" alone. This is based on the type of system, construction date, number of joints, and joint type.

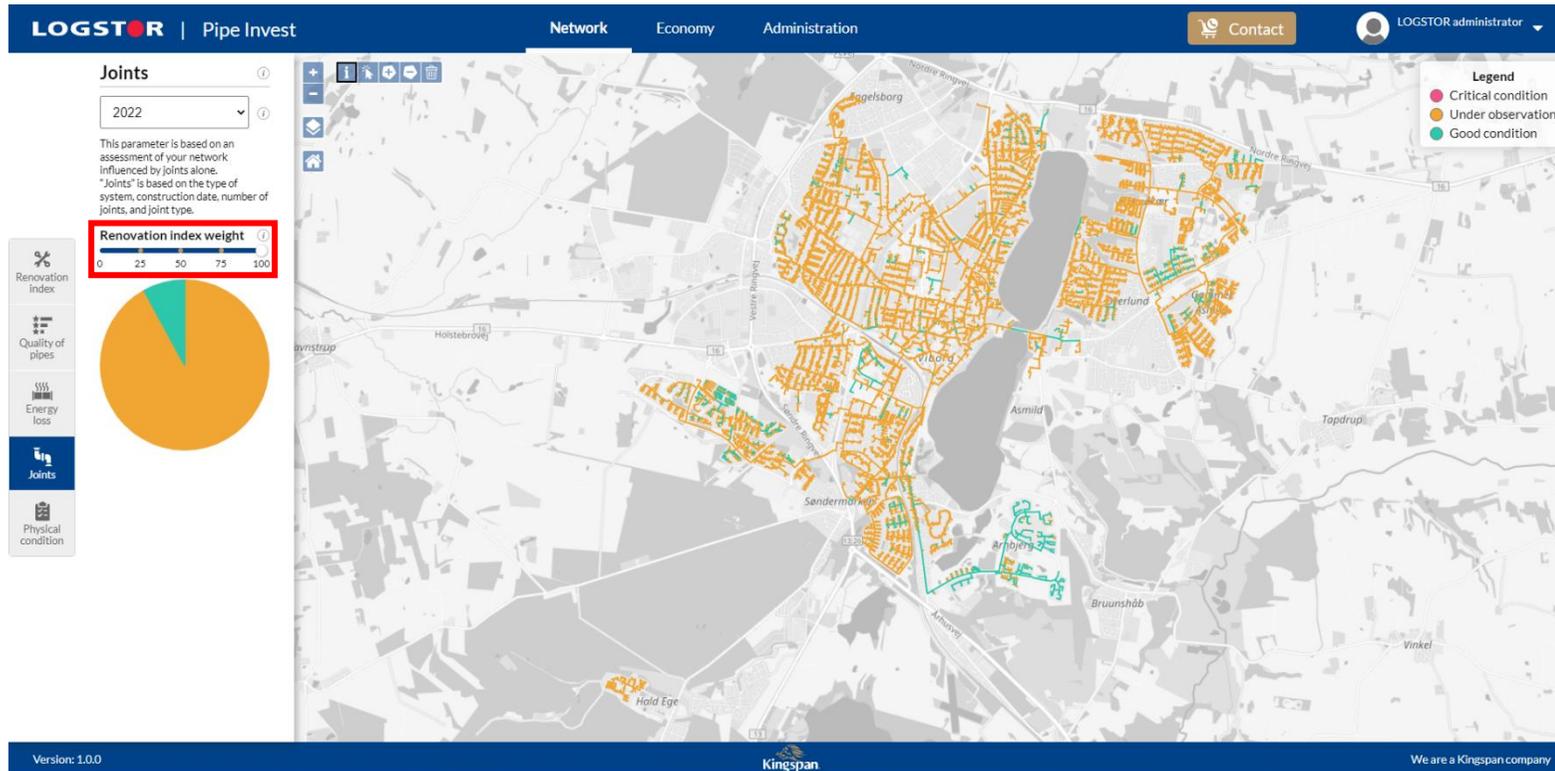


Figure 7: Subsection Joints. Evaluation and adjustment of weight in the Renovation Index.

## Physical condition

In the last subsection under the “Network”-tab, the assessment of the network is based on the influence of “Physical conditions” alone. This is based on construction date.

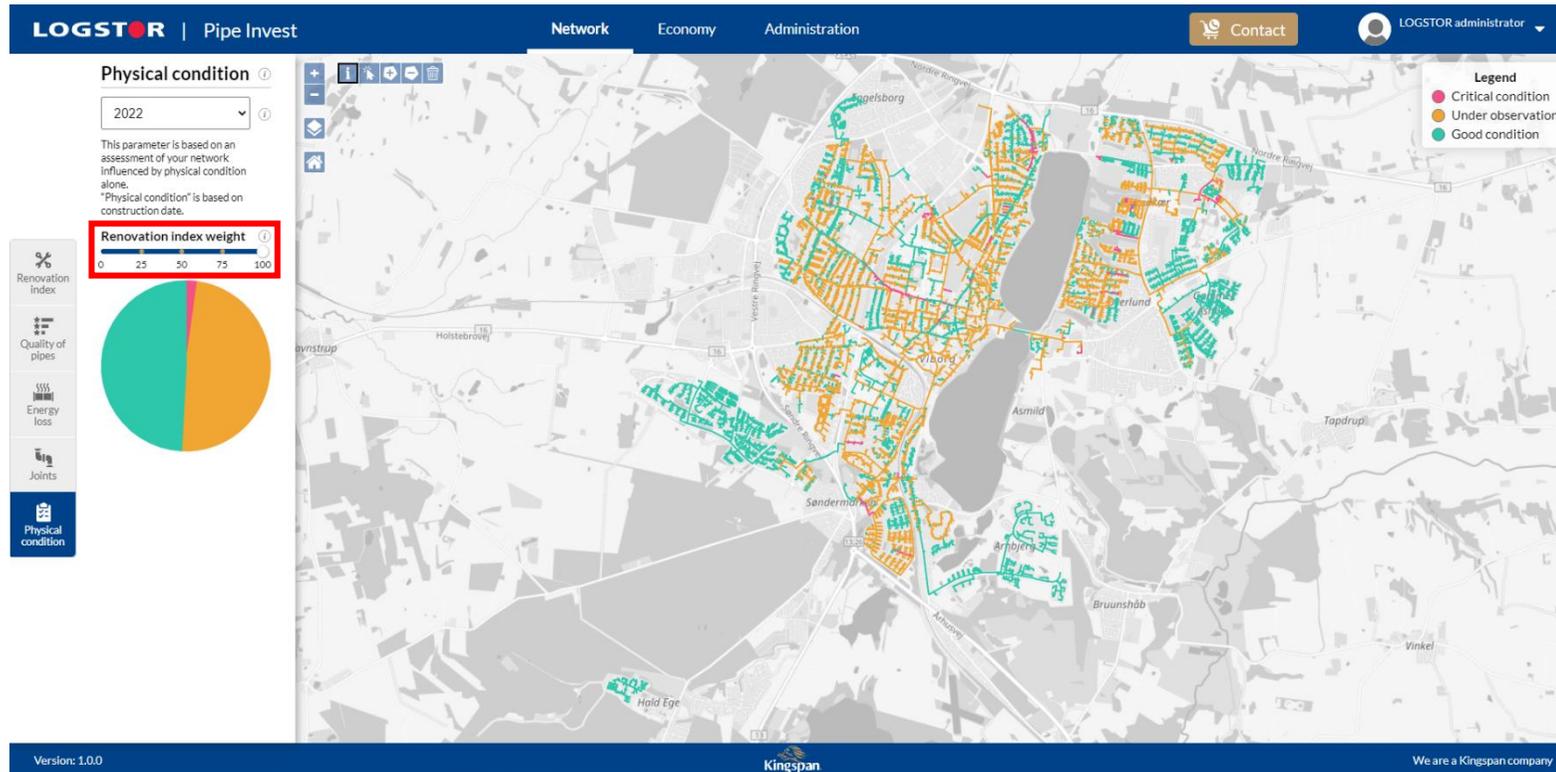


Figure 8: Subsection Physical Condition. Evaluation and adjustment of weight in the Renovation Index.

As mentioned, use the sliders to adjust the weight of each of these parameters on the total “Renovation Index”. It is a calibration of the basic input and calculations the Pipe Invest matrix uses, a basic calculation you might need to adjust somewhat based on the quality of your data for each parameter.

## Baseline

Once you have adjusted each subsection to your liking, please revert to the “Network”-tab with the “Renovation Index”. Does it correspond to your general opinion of the state of your network? If not, you can adjust the baseline to reflect your network correctly.

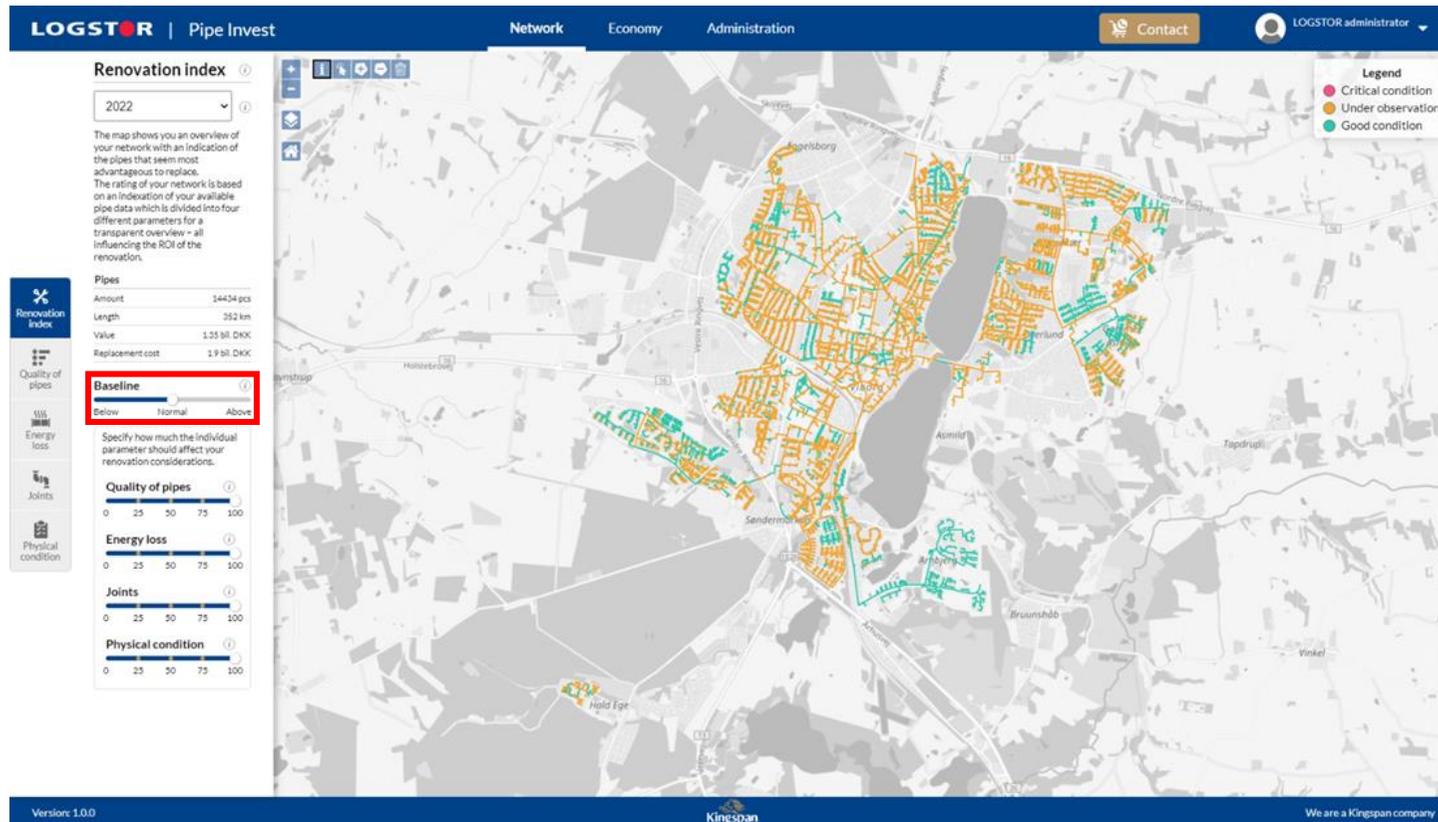


Figure 9: Network tabs Baseline. Evaluation and adjustment of the baseline for the total Renovation Index.

Now you see a map that reflects the state of your network, based on data imported into Pipe Invest evaluated and adjusted to your knowledge.

Before we turn to the “Economy”-tab to perform the budgetary scenarios, there are a few tips regarding the use of the map.

## Map functionality

It is possible to select single pipelines, or even an area from your network, that you want to have a closer look at. The map has two layers; an information layer and a selection layer.

## The information layer

This layer makes you able to click on individual pipelines - it will become pale blue so you can see the start and finish of it – and a box will provide more information about this particular pipeline.

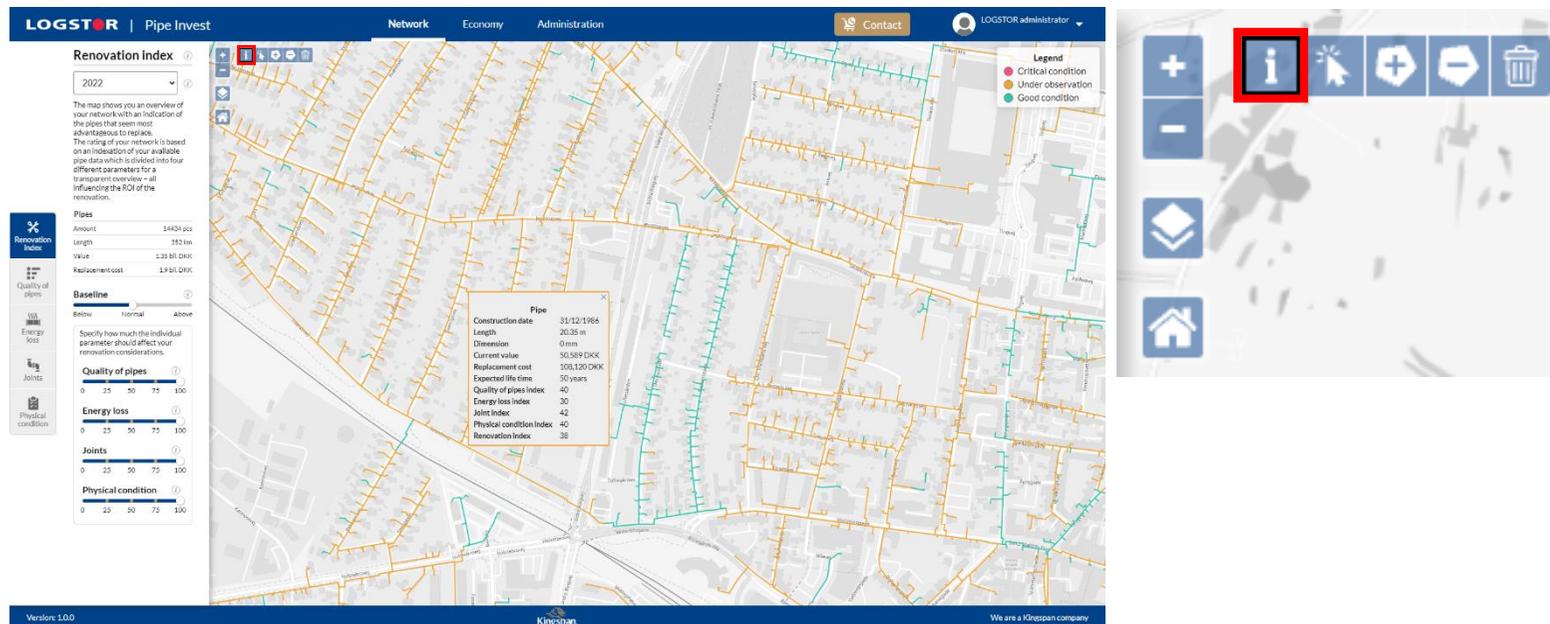


Figure 10: The Information layer on the map. Information for individual DH pipe lines.

You will still see the condition colour from the “Renovation Index” on the edge of the box (in this example yellow) so you can keep your overview of which state this particular pipeline is in.

## The selection layer

This layer makes you able to point out selected pipelines or areas that you want to take a closer look at. I.e. a part of a city, a small neighbourhood, or single transmission lines. All selected pipelines turns black to signal that this is the selection.

You can either select pipelines individually with the cursor or use the polygon tool to mark an area.

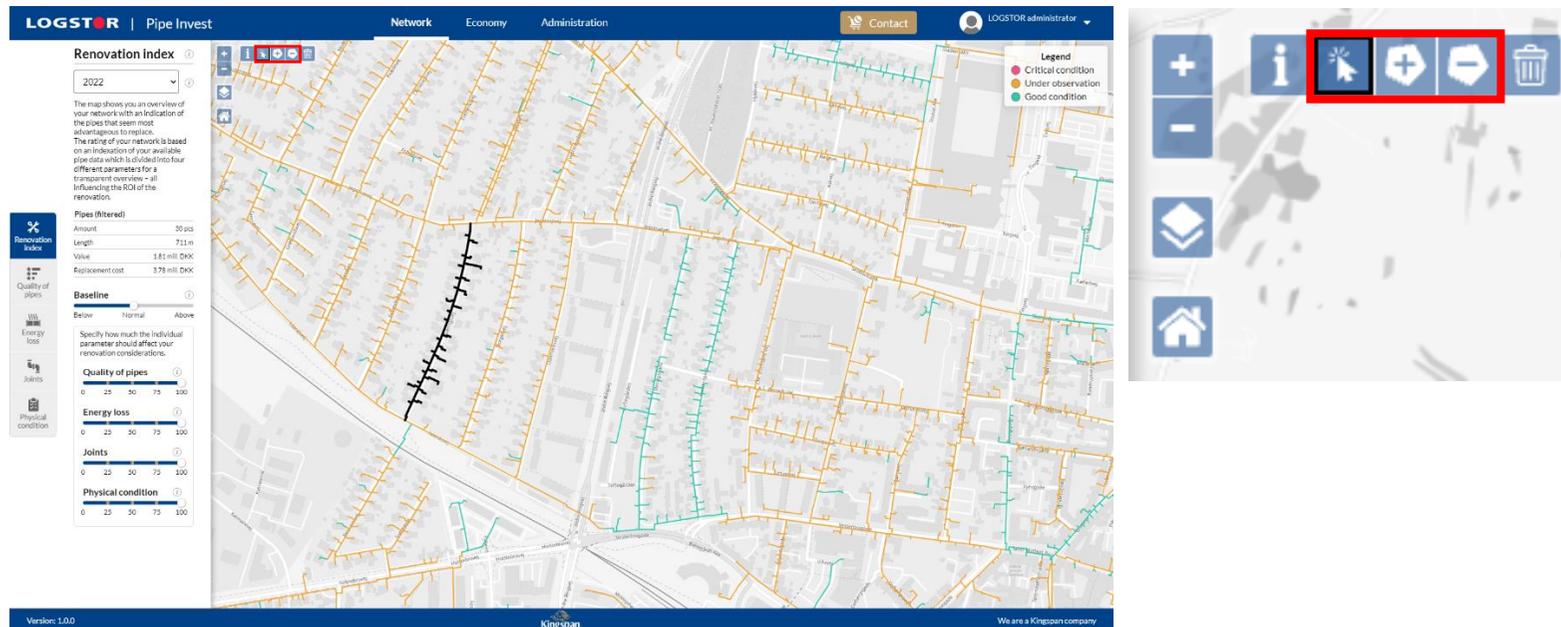


Figure 11: The Selection layer on the map. Work with only a part of the dataset.

Please note that while an area is selected the Pipe data will only show the selected area.

You can de-activate the layer with the inactive pipelines in the map by clicking the icon with the layered squares in order to keep focus on the selected area (and go back to the information layer again if you would like to see the coloured status of the pipe lines in the selected area instead of the black lines). Furthermore, you can de-select the selected area by using the trashcan icon.

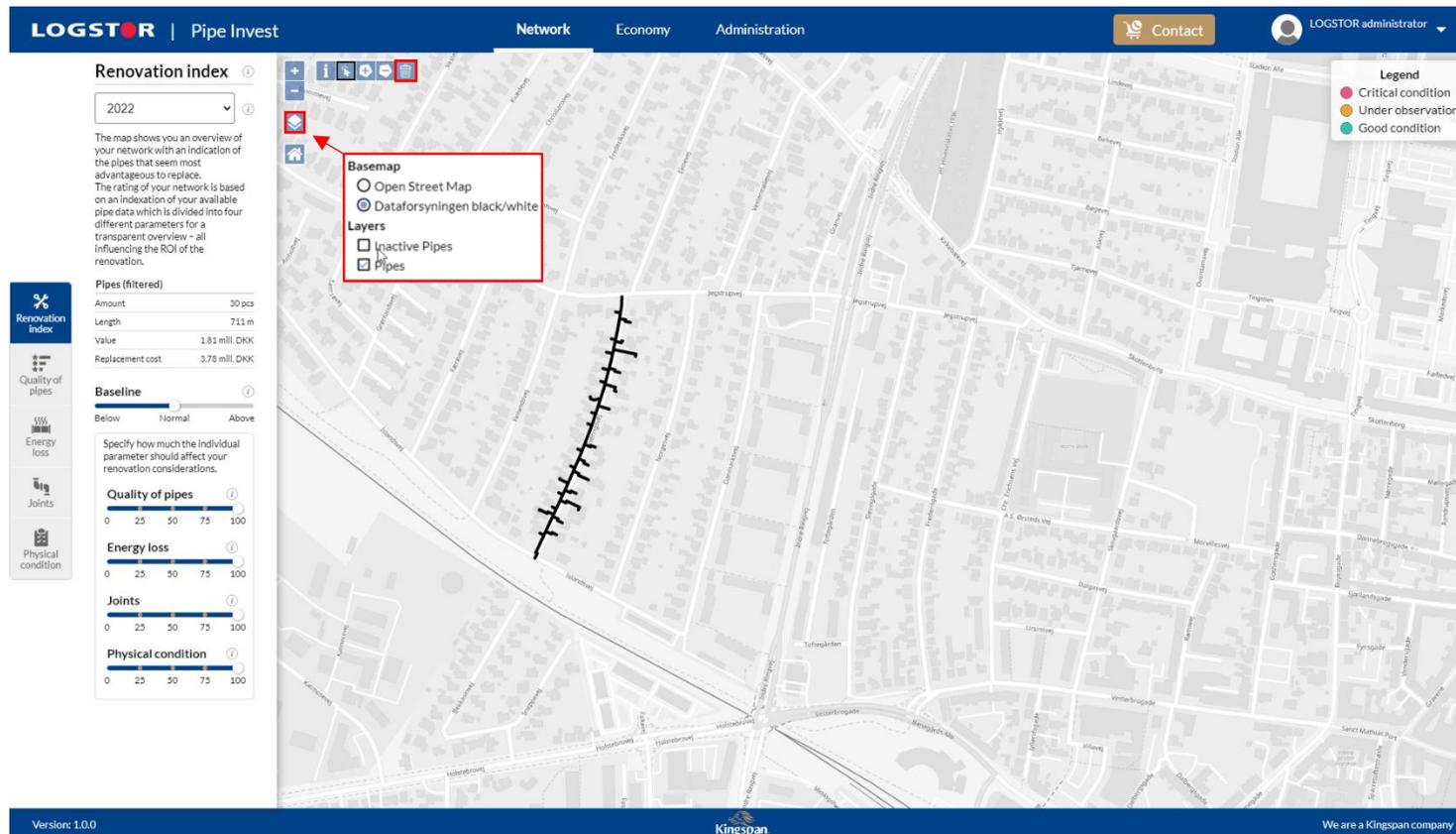


Figure 12: The Selection layer on the map. Work with layers and selections on the map.

Now - with all settings adjusted to reflect the current state of the total network - let's have a look at what this means when looking into the future in terms of investment needs.

## Economy tab

With the set of data of interest – whether the full set or a selected area – you can now go to the “Economy”-tab.

Financing operates with two views that are interconnected; a bar chart and a map. The two of them will provide information to your reinvestment planning. The bar chart with the budget curve will provide an overview of the financial effects and the map will show the location of the pipes in question.

Have a look at the blue line across the bar chart (figure 13 next page). In the example it is set to 2 mio EUR/year – see the budget slider marked to the left. You will see that the coming years until 2034 it seems to balance the need for investments since it shows over the 0-line, after that you will not have enough resources in your budget to keep the DH pipe network in the same quality condition as today.

Now try to move the budget slider to illustrate a budget smaller or larger than today – and see the effect on the chart; the 0-line will move up or down as calculated with a new budget – and also the year the blue budget line intersects with the 0-line will change. In this way you can make scenarios for financing the refurbishment needs.

The bar chart will also show the bars in the color codes we know from the map; good DH pipes are the green parts, yellow bars indicate that there are pipes in the map that need to be observed, red indicating pipes that are in critical condition and therefore liable for refurbishment.

Using the budget slider the “Economy”-tab will immediately show you what effect different budgets will have on the longterm condition of your network. You can still refer to the map at the right side to see i.e. where the red pipes are, or make selections on the map directly by using the map functionality tools on the map as mentioned.

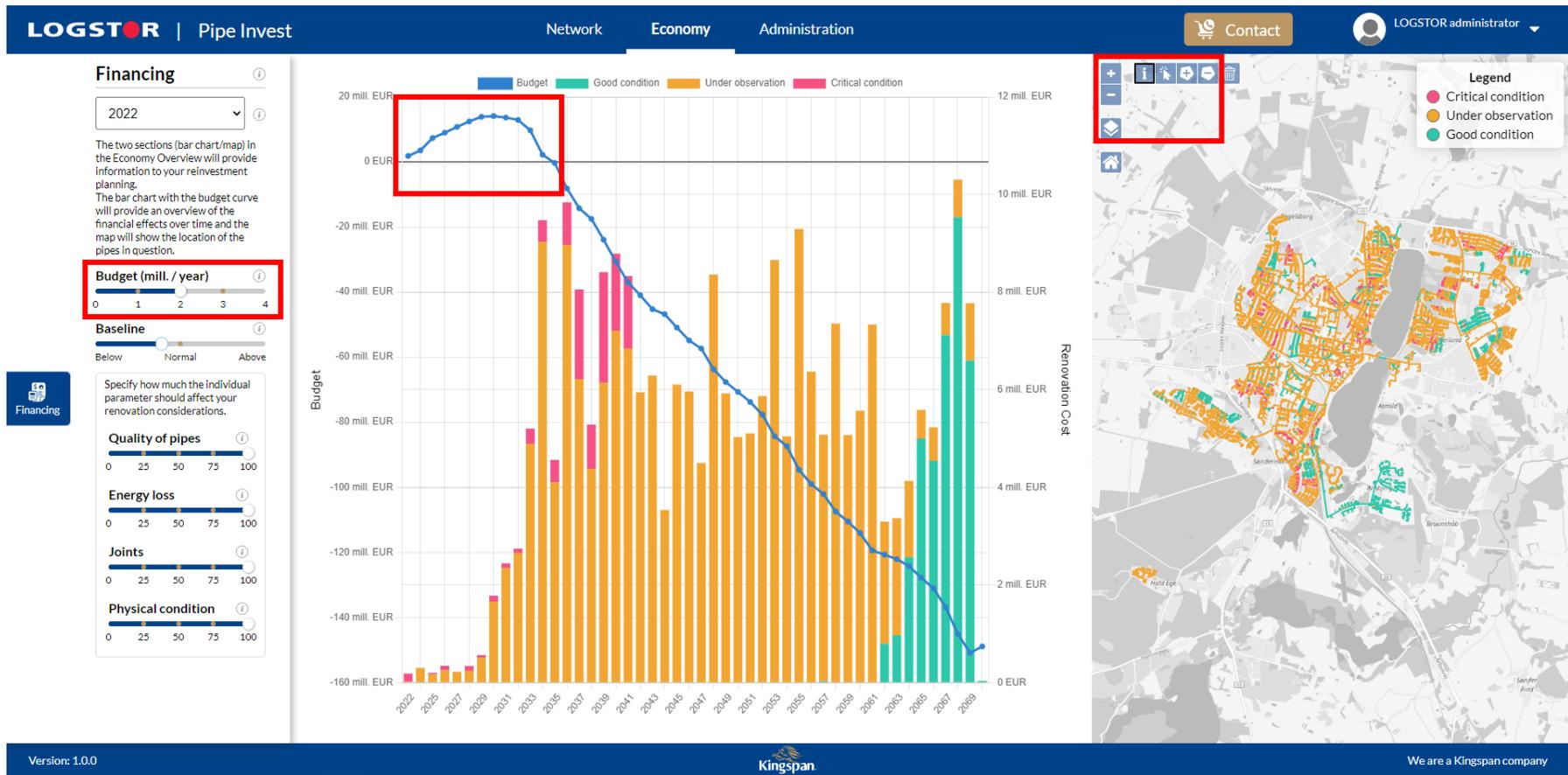


Figure 13: Economy tab. Make budget scenarios and see effect on the long-term condition of the DH network.

## Contact

If you wish to discuss renovation with us at LOGSTOR you can click the "Contact"-button, which will take you to a contact form. Fill it in, and our sales team will reach out to you regarding your request. You can either contact us in general or use the selection tool layer to point out specific pipelines or areas you wish to discuss. The data can be included with the form and help us with an overview of the pipeline data.

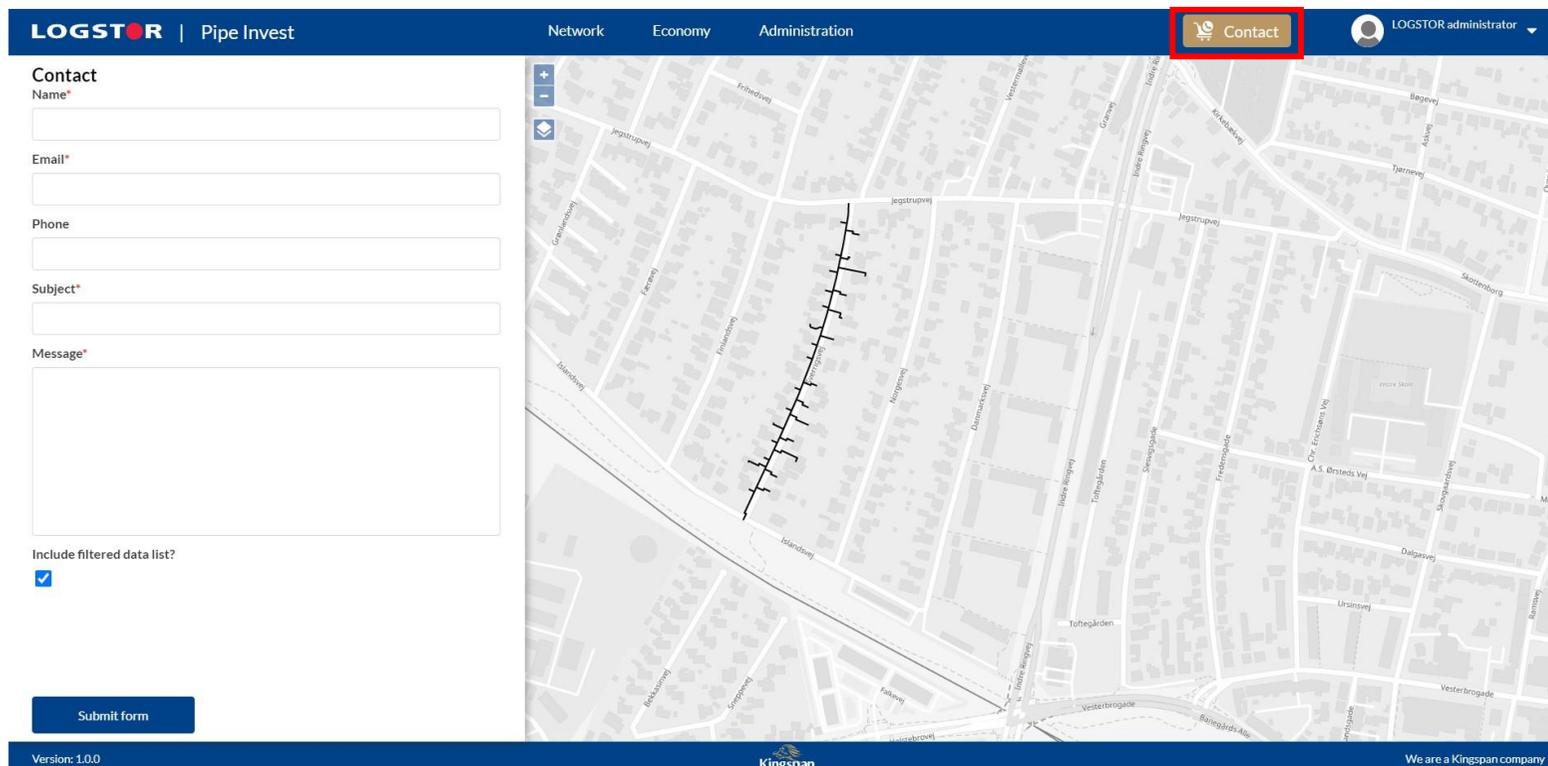


Figure 14: Contact form. Discuss your renovation project with us or receive an offer.

If you have any further questions regarding the use of Pipe Invest, please contact us at: [logstor.digital@kingspan.com](mailto:logstor.digital@kingspan.com).